

Mold and Indoor Air Quality

Mold Overview

Molds are a normal part of the environment, and are naturally present in both indoor and outdoor environments year round. Molds are fungi, with thousands of known species, and there are molds of virtually every color. Molds produce tiny cells or “spores” that spread throughout the air. These spores form new mold growth or “colonies” when they land on a surface and there is sufficient moisture, warmth, and nutrients. All of us are exposed to mold spores every day in the air we breathe.

Molds typically do not create a problem in indoor environments unless they land on a wet area and begin growing. Molds can grow on almost any surface as long as they have moisture, oxygen, and an organic food source (including dust, dirt, wood, paper, carpet, insulation, and food). By removing the source of water, you can eliminate mold growth.



Health Effects from Mold

Most people will not have health effects from exposure to mold. Some individuals are sensitive to mold, and health problems associated with mold for these individuals can include allergy symptoms, headaches, eye and skin irritation, asthma and other respiratory symptoms. More serious symptoms such as fungal lung infections can occur in sensitized individuals who have compromised immune function or those with chronic lung illnesses such as chronic obstructive pulmonary disease (COPD). No link between inhalation of mold by occupants in building environments and serious systemic illnesses such as cancer has been scientifically established.



When Is Mold a Concern?

Recent media attention or “hype” about mold often creates undue concern about exposure to mold. Employees may attribute a wide range of symptoms and even serious illnesses to exposure to mold in the workplace, even when there is no active indoor mold growth or for medical conditions not associated with exposure to mold. This can be unfortunate in that the true cause of the symptoms or illness is not pursued, and the correct medical treatment is not received. It is important that any employee experiencing serious symptoms receive medical care. An occupational health physician is the most effective medical resource to help an employee determine if they are experiencing symptoms or illness related to the workplace.

When active mold growth is occurring indoors, individuals sensitive to mold may experience an onset of or increase in mold-related symptoms. For this reason, any active mold growth in an indoor environment should be remediated as soon as possible, and the source of moisture contributing to this mold growth identified and corrected to prevent future mold growth. Allowing a mold problem to continue unchecked will create a health risk for mold-sensitive building occupants, and may also lead to damage to the facility from the mold feeding on building structural elements such as wood.

Typically, a problem with indoor mold growth can be seen or smelled. Many things are frequently mistaken for mold, including black combustion soot commonly found around air supply vents, efflorescence or crystals from concrete, bricks and other masonry, and rusting. Mold has a characteristic fuzzy, spotted appearance and musty odor.

What about “toxic black mold”? Certain mold species are capable of producing small amounts of toxic chemicals known as mycotoxins. These mold species are not themselves toxic or poisonous, and there is currently no scientific evidence that harmful exposures to these toxic chemicals will occur from mold in a building. *Stachybotrys chartarum* is a greenish-black mold that produces mycotoxins and is the basis for the incorrect term “toxic black mold.” The



Centers for Disease Control (CDC) reports that “hazards presented by molds that may produce mycotoxins should be considered the same as other common molds which can grow in your house.”

Testing for Mold

Based on a review of the scientific literature on mold and consultation with experts in the field, DLS has determined that quantitative sampling for mold does not generally provide meaningful information for the reasons listed below, therefore DLS does not conduct this type of sampling during indoor air quality assessments.

- Mold spores are present in all indoor and outdoor environments.
- There are no regulatory standards governing quantitative levels of mold.
- Individual sensitivities to mold are widely variable. Highly sensitive individuals may experience symptoms at very low levels.
- If indoor mold growth is occurring, it can typically be seen or smelled.
- Laboratory conditions to test for live or growing colonies may differ from those in the environment tested, therefore results may not accurately reflect what is occurring in the space tested.
- Live or growing colonies of mold do not give off spores or consistent quantities of spores at all times (variations may occur from day to night, at different points during the life cycle, etc.).
- Mold remediation and mold prevention methods are the same for all types of mold. The Centers for Disease Control (CDC) reports that “it is not necessary to determine what type of mold you have. All molds should be treated the same with respect to potential health risks and removal.”

Preventing Mold Problems

Since it is not possible to eliminate mold spores, the key to preventing mold growth in indoor environments is elimination of moisture. Common sources of moisture include roof leaks, leaking pipes, condensation formed on uninsulated pipes, and condensation formed on walls and other surfaces due to temperature differentials. Sources of moisture should be identified and corrected as quickly as possible. The longer a moisture problem is allowed to go unchecked, the greater the chance that a mold problem will develop.

There is the potential for mold growth if wetted materials are not dried within 48 – 72 hours, therefore they should be dried as quickly as possible. However, mold growth will not always occur under these conditions. The most prudent practice is to remove and replace water-damaged porous materials (e.g., ceiling tiles, carpet and backing, wallboard) that cannot be dried and cleaned within 72 hours. If removal of these materials is not feasible or practicable, these materials should be dried and cleaned as soon as possible, and subsequently monitored for mold growth through visual inspection and/or detection of mold odor.

Remediating Mold Problems

It is recommended that mold remediation be conducted in accordance with the EPA guidance, Mold Remediation in Schools and Commercial Buildings, available at www.epa.gov/mold, in particular if the area of mold to be cleaned is greater than ten square feet.

Mold remediation techniques include:

- Wet vacuuming or steam cleaning
- Damp wipe cleaning with water, water and detergent, or water and wood cleaner (for wood surfaces)
- Drying followed by HEPA vacuuming
- Removal and disposal of contaminated materials

OSHA and EPA both indicate that use of biocides such as bleach is not recommended as these biocides are toxic to humans as well as to molds, and their use is typically not necessary. After an area is sterilized, a background level of mold spores comparable to the outdoor environment will quickly reoccur, and mold growth will reoccur unless moisture is controlled. In limited cases, such as when immuno-compromised individuals are present, a professional may determine that biocides are necessary.

Solid or non-porous surfaces such as plastics and metals that are contaminated with mold can be readily cleaned and dried. Managing mold contamination in porous materials (e.g., wallboard, carpet, carpet backing, paper) is more difficult.

Even if mold is killed with a biocide, dead spores or mold fragments can still act as allergens. Also, mold growth can readily reoccur in previously mold-contaminated porous materials when moisture is reintroduced due to remaining mold “hyphae,” which act in a similar manner to plant roots. Therefore actual removal of porous materials that have been contaminated with mold is recommended. If removal is not feasible, alternate methods such as drying and HEPA vacuuming should be used to achieve the greatest possible removal of mold. These materials should subsequently monitored for mold growth.

Painting over active mold growth is never recommended. Even on non-porous surfaces, the area must first be cleaned of mold and dried before it can be painted. For porous surfaces such as wallboard, removal is recommended.

Protection of Employees Conducting Mold Remediation

Employees conducting any mold remediation activities should wear the following personal protective equipment at a minimum:

- N-95 respirator
- Gloves
- Goggles

If mold remediation is conducted during one workday on the equivalent or greater than 10 square feet of actual mold-contaminated surface up to 100 square feet of mold-contaminated surface, employees should wear the following personal protective equipment:

- N-95 respirator or half-face cartridge-type respirator with HEPA filter
- Gloves
- Goggles
- Disposable overalls

If mold remediation is conducted during one workday on the equivalent or greater than 100 square feet of actual mold-contaminated surface, employees should wear the following personal protective equipment:

- full-face cartridge-type respirator with HEPA filter
- Gloves
- Disposable full body clothing, head gear, and foot coverings

These employee protection guidelines are from the EPA Guidance document “Mold Remediation in Schools and Commercial Buildings,” and should be used in conjunction with the EPA guidance on necessary containment methods. If it is not possible to adhere to these guidelines for your employees, then mold remediation should be conducted by an outside contractor.

Additional Information and Resources

www.epa.gov/mold

www.cdc.gov/mold

www.osha.gov search on “mold